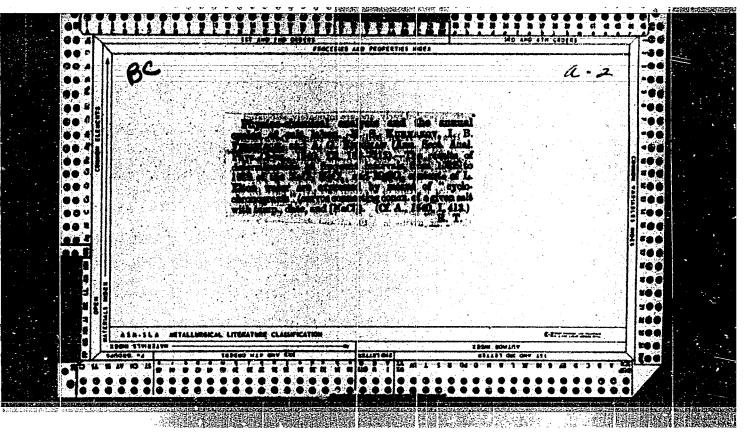
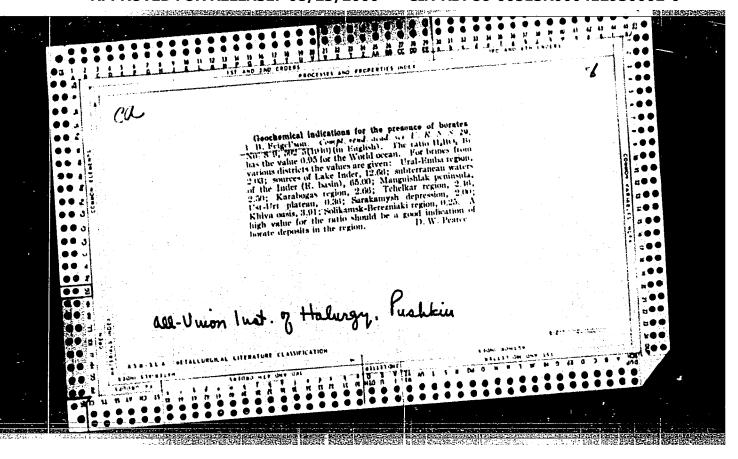


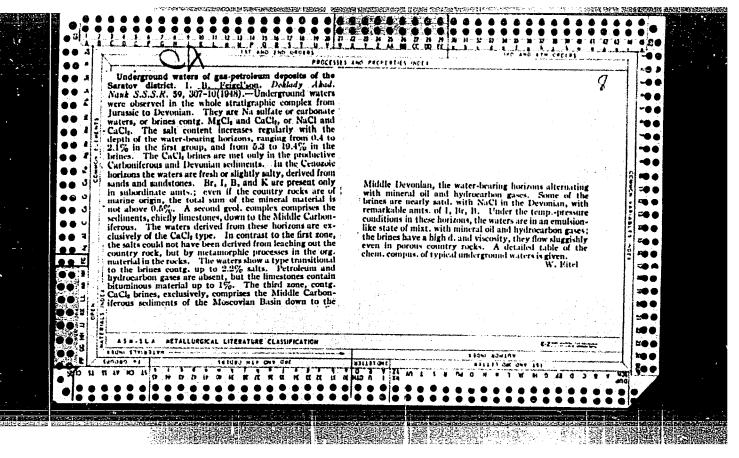
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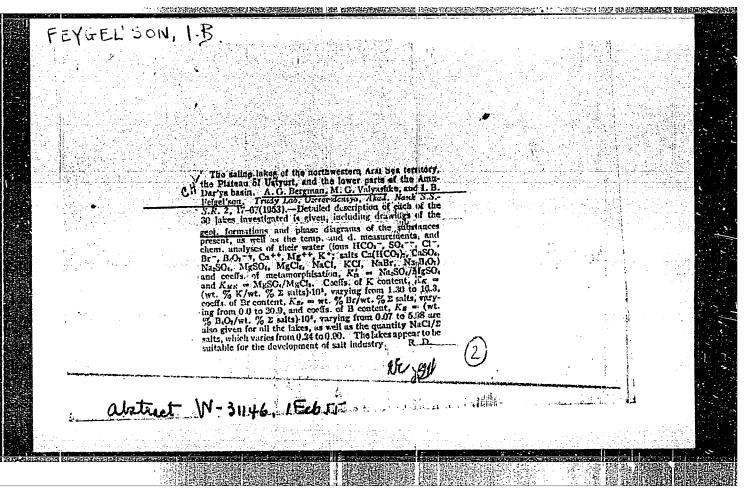


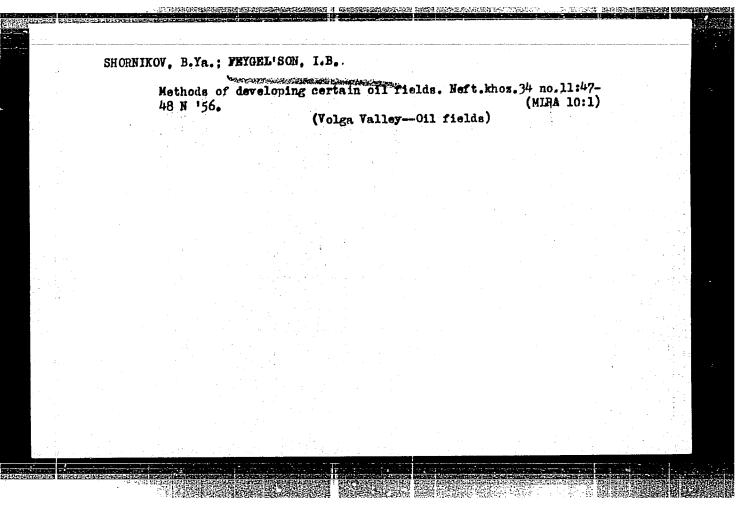
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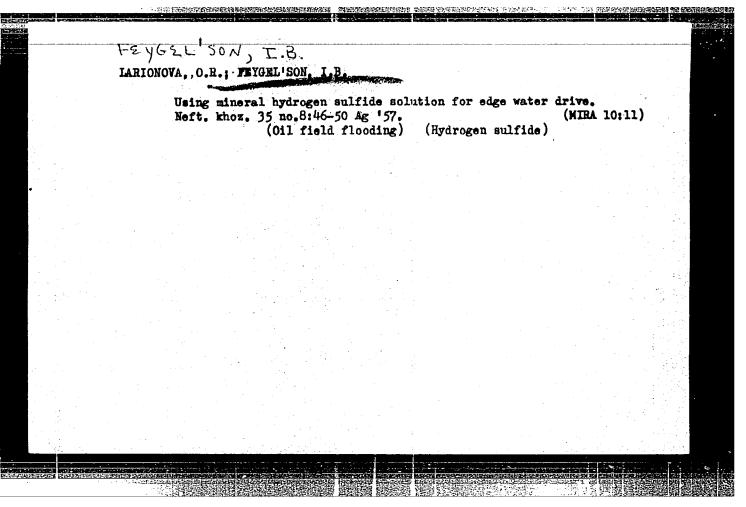
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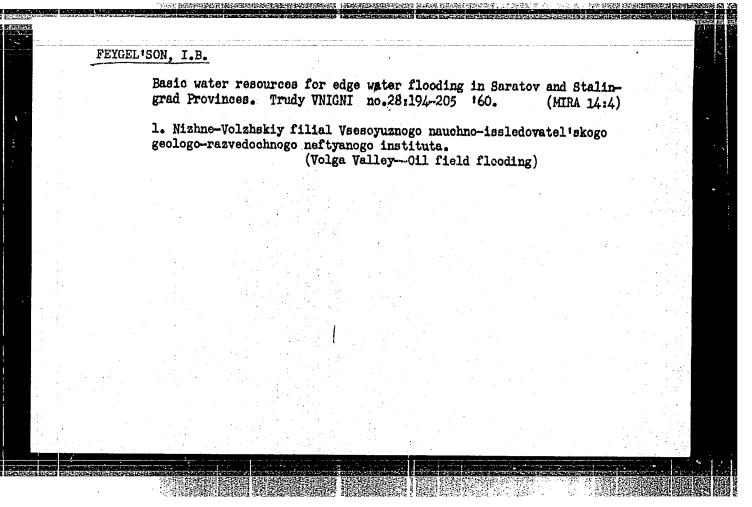
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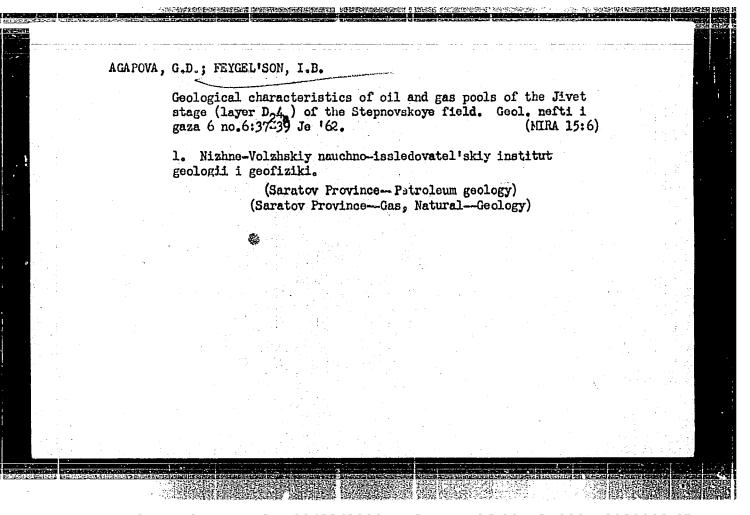
Distribution of saturation pressure in the Bi layer of the Zhirnovsk oil field. Meft.khoz. 37 no.3:47-49 Mr 159.

(MIRA 12:5)

(Stalingrad Province--Oil reservoir engineering)

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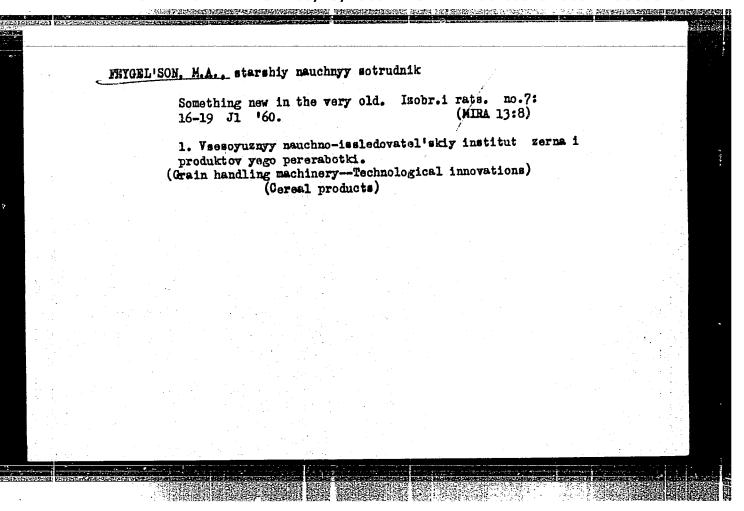
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[Enterprises of the petroleum industry] Predpriatilia neftianoi uromyshlennosti. 1958. 28 p. Moskva, Gos. izd-vo lit-ry po stroit i arkhit.

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1. Russia (1923- U.S.S.R.) Gosudarstvennyy komitet po delan
stroitel'stva.

(Petroleum industry)



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Obledenenie samoletov i bor'ba s nim. (Grazhdanskaia aviastsiia, 1940, no.1, p.8-10, illus.)

Title tr.: Icing of aircraft and the fight against it.

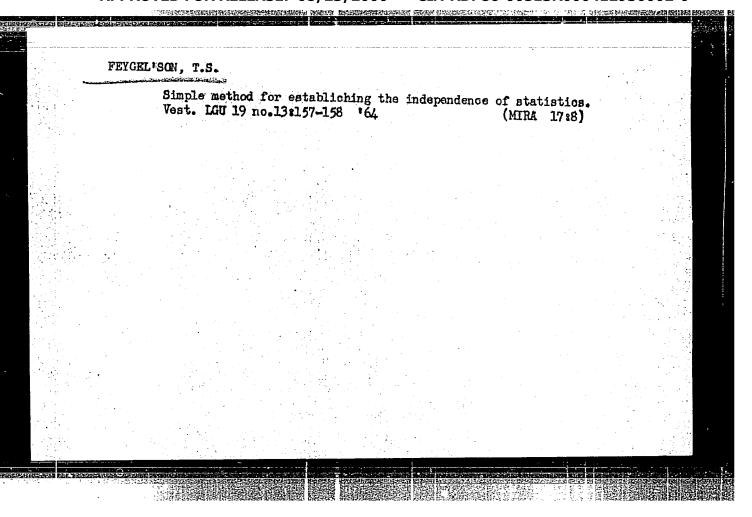
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S0: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955.

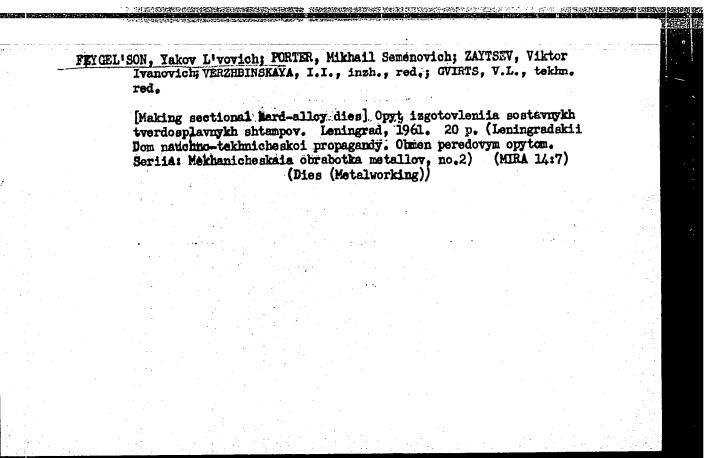
PEYGEL'SON, S. I., Engr. Cand. Tech. Sci.

Dissertation: "Protection of Airplanes Against Icing." Moscow Order of Lenin Aviation
Inst imeni Sergo Ordzhonikidze, 9 Jun 47,

SO: Vechernysya Moskva, Jun, 1947 (Project #17836)



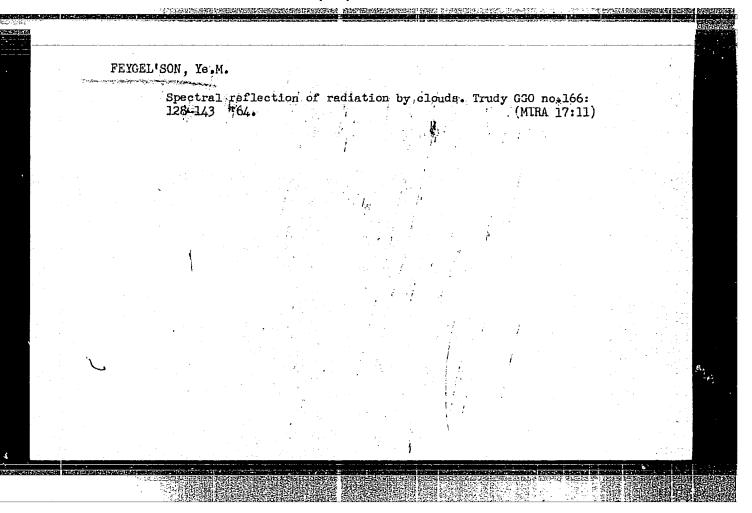
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	Stratification theory. Dokl. AN SSSR 164 no.1:158-160 S '65. (MIRA 18:9)	
	1. Gruppa matematicheskoy geologii Leningradskogo otdeleniya Matematicheskogo instituta im. V.A. Steklova AN SSSR. Submitted	
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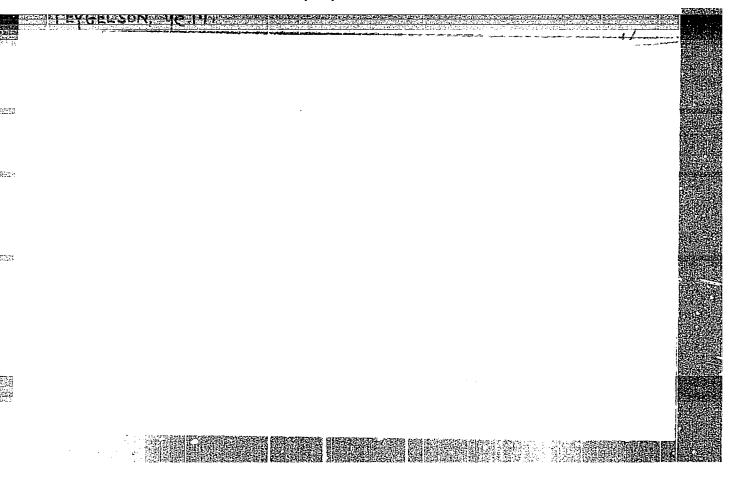
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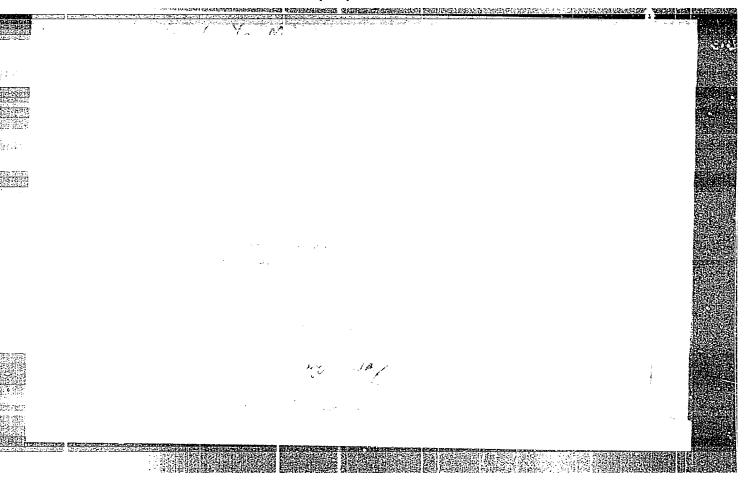
Role of radiation in the buildup of clouds. Izv. AN SSSR Ser. geofiz. no.8:1247-1252 Ag '64 (MIRA 17:8)

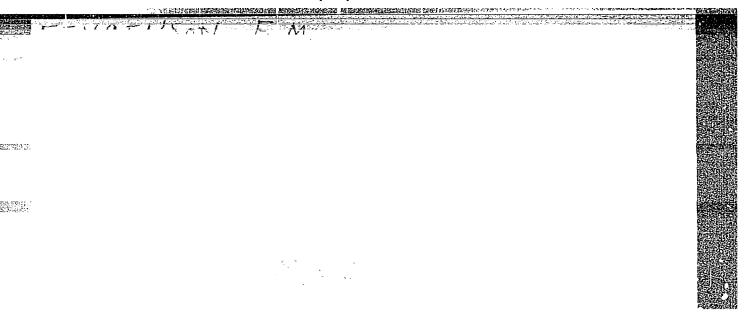
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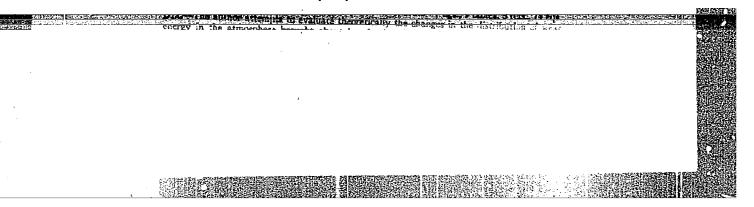


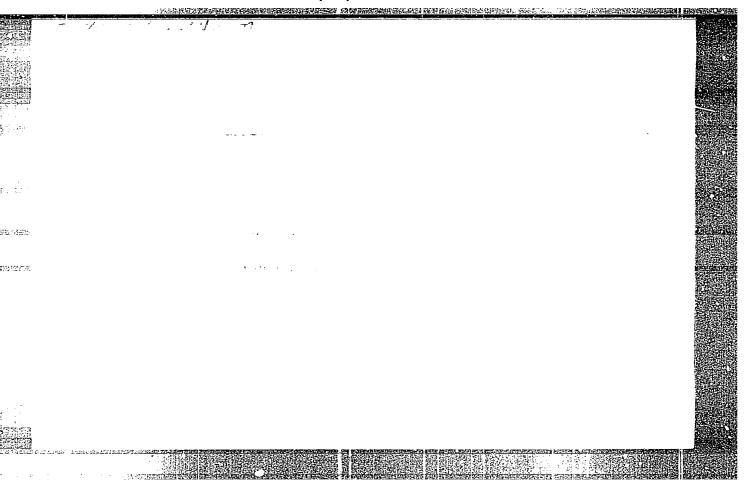
FEYGEL'SON, Ye	. м.	CAND PHYSICOMATH SCI.
Dissertation:	"Distribution of Temperature of during Radiant and Vertical To	f the Earth's Atmosphere by altitude urbulent Heat Exchange."
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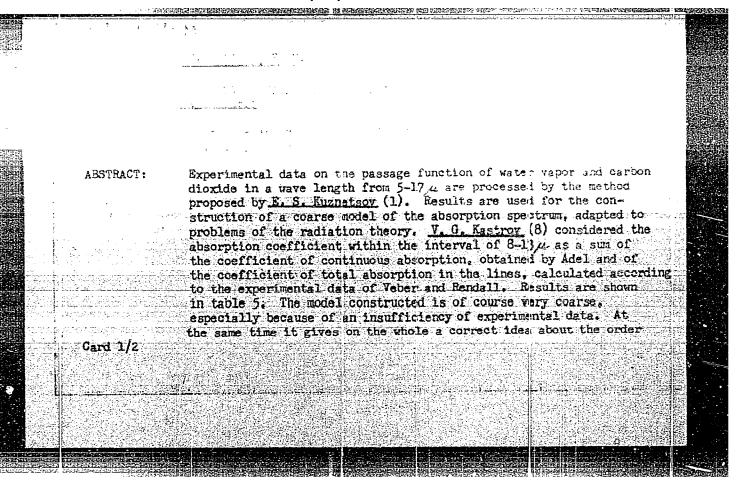












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USSR/Geophysics - Heat exchange in the atmosphere

FD-1785

Card 1/1

Pub 45-7/18

Author

: Feygel'son, Ye. M.

Title

Taking into account selective absorption in the theory of radiant heat-ex-

change in the atmosphere

Periodical:

Izv. AN SSSR, Ser. geofiz. 3249-260, May-Jun 1955

Abstract

The author investigates radiant heat-exchange of long-wavelength radiation in the terrestrial atmosphere under the assumption of the division of the absorption spectrum of water vapor into regions of small, medium and large values of the coefficients. He clarifies separately the role of large coefficients in the upper layers of the atmosphere. He thanks Ye. S. Kuznetsov. Four references: Ye. S. Kuznetsov, "Distribution of the temperature of the atmosphere along the vertical under radiant equilibrium," Trudy Instituta teoretich. geofiziki, 1, 1946; Ye. M. Feygel'son, "Absorptive properties of water vapor and carbon dioxide in the atmosphere," Izv. AN SSSR, Ser. geofiz. No 1, 1955; K. Ya. Kondrat'yev, Perence dlinnovolnovogc izlucheniya v atmosfere (Transfer of long-wave radiation in the atmosphere), GITTL, Moscow-

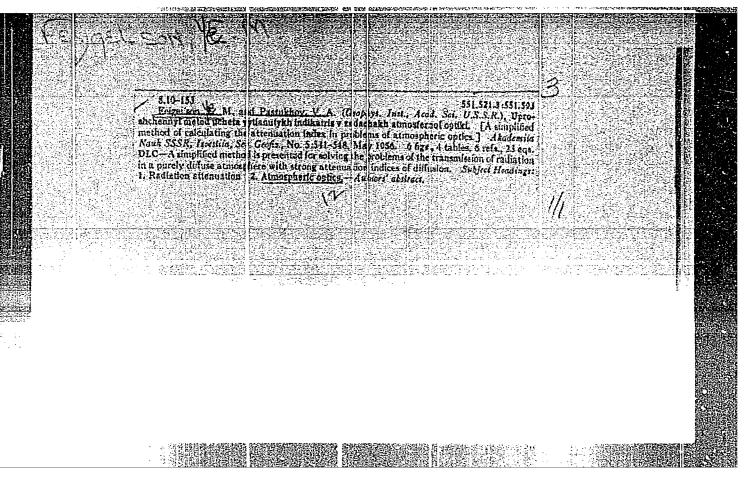
Leningrad, 1950.

Institution:

Geophysical Institute, Academy of Sciences USSR

Submitted:

March 20, 1954



AUTHOR: Feygel'son, Ye. M. 60-37-3/7

TITLE: The Effect of Clouds on the Thermal Equilibria in the

Atmosphere (Vliyaniye oblakov na teplovoy rezhim

atmosfery)

PERIODICAL: Trudy Geofizicheskogo instituta Akademii nauk SSSR,

1956, Nr 37(164), pp. 62-88 (USSR)

ABSTRACT: The author examines the transfer of long-wave radiation

in an atmosphere containing a homogeneous horizontal layer of clouds of finite thickness and computes the distribution of temperature in such an atmosphere when a state of radiative equilibrium exists outside the cloudy layer. The dispersion and absorption of long-wave radiation in clouds with variants, the characteristics of solar radiation penetration in a cloudy atmosphere, and the selective character of the absorption spectra of vapor outside the clouds are considered. There are 2 tables, 7 figures, and 7 references, all

USSR.

AVAILABLE: Library of Congress

Card 1/1

"The Approximate Methods of Evaluating the Scattered Light Intensity in the Earth's Atmosphere. The Results of Calculations for the case of Anisotropic Scattering," paper submitted at International Assoc, of Meteorology Meetings, Toronto, Canada, 3-14 Sep 57

C-3,800,327

Eval... B-3,099,096

FEYGEL'SON, Ye M

PHASE I BOOK EXPLOITATION

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3(7)

Akademiya nauk SSSR. Komitet po geodezii i geofizike.

Tezisy dokladov na XI General noy assambleye Mezhdunarodnogo geodezicheskogo i geofizicheskogo soyuza. Mezhdunarodnaya assotsiatsiya meterologii (Abstracts of Reports at the 11th General Assembly of the International Union of Geodesy and Geophysics. The International Association of Meteorology) Moscow, 1957. 38 p. /Parallel texts in Russian and English or French/ 1,500 copies printed. No additional contributors mentioned.

This booklet is intended for meteorologists.

COVERAGE: These reports cover various subjects in the field of meteorology. Among PURPOSE: the specific subdivisions discussed are: the heat balance of the Earth's surface, jet streams, transference of heat radiation, electric coagulation of cloud partlcles, turbulent diffusion, cloud studies, and others. Abstracts of all the articles are translated into either French or English. There are no references given.

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The Heat Balance of the Earth's Surface Budyko, M.I. Card 1/3

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Feygel'son Ye. M., M. S. Malkevich, S. Ya. Kogan, T. D. Koronatova, K. S. Glazova, and M. A. Kuznetsova

Raschet yarkosti sveta v atmosfera pri anizotropnom rasseyanii, ch. l (Computation of Light Intensity in the Atmosphere in a Case of Anisotropic Scattering, Pt. l) Moscow, Izd-vo AN SSSR, 1958. lOl p. (Series: Akademiya nauk SSSR. Institut fiziki atmosfery. Trudy, nr l) Errata slip inserted. 2,000 copies printed.

Ed.: G. V. Rozenberg, Doctor of Physical and Mathematical Sciences; Ed. of Publishing House: V. I. Rydnik.

PURPOSE: This book is intended for physicists and scientists engaged in the study of atmospheric optics.

COVERAGE: This work contains the results of computation on the intensity of light scattered anisotropically in the atmosphere under various physical parameters and functions of scattering. The solution of integro-differential equations of the theory of radiative transfer in an anisotropically scattering medium Card 1/4

		Section 10 December 1
•	Computation (Cont;) SOV/2545	
	was obtained by the method of successive approximations. The work was carried out by the staff members of the Laboratory of Atmospheric Optics within the Institute of Physics of the Atmosphere, Academy of Sciences, USSR. No personality are mentioned. There are 23 references: 14 Soviet, 4 English 4 German, and 1 French.	Les 3h,
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	Ch. II. Processing Observation Data Card 2/4	19

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	1. Review of Observation materials 2. Utilization of experimental data 3. Processing scattering functions 4. Change from optical thickness to the geometric control of the process of the	etrical height	19 22 24 25
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SOV/49 -58-10-7/15

AUTHOR: Feygel'son, Ye M

TITLE: On Interpreting Observations of Sky Brightness (Ob interpretatsii nablyudeniy yarkosti neba)

PERIODICAL: Izvestiya Akademii Nauk SSSR, seriya geofizicheskaya, 1958, Nr 10, pp 1222-1233 (USSR)

ABSTRACT: Observations on the brightness of scattered light are used extensively to determine the scattering properties of the atmosphere (Ref.1). The present article tries to explain the following points in interpreting the observational theory: 1) what information on the scattering function can be obtained from brightness measurements based on the theory of single scattering, 2) to what degree multiple scattering can be ignored, 3) how accurate a correction for multiple scattering can be made, using Ye. V. Pyaskovskaya-Fesenkova's method. The propagation of light in the Earth's atmosphere can be described by an equation of the form:

$$\cos \theta \frac{\partial I(\tau; r)}{\partial \tau} = \frac{1}{4\pi} \int I(\tau; r') \gamma (\tau; r; r') d\omega' - I(\tau; r) +$$

$$+ \frac{s}{4} \exp \left[- (\tau^* - \tau) \sec \zeta \right] \gamma (\tau; r_0)$$
 (1)

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On Interpreting Observations of Sky Brightness

Here τ is the optical thickness of the atmosphere -

$$\tau = \int_{0}^{Z} \sigma(z) dz \qquad - \qquad (2)$$

where $\sigma(z)$ is the scattering coefficient, I(t;r) is the intensity of radiation at a height z in a direction r (at an angle θ to the vertical and an azimuthal angle ϕ), γ is the relative scattering function and r' is the direction of propagation of scattered light. The scattering function depends on $\cos(r,\,r')=\cos0\phi$. The atmospheric boundary conditions are given by Eq.(4), where q is the albedo of the Earth's surface and $F_1(\tau)$, $F_2(\tau)$ are the

integral functions of $I(\tau, r)$ shown. Multiple scattering is represented in Eq.(1) by the first term: if this is neglected, Eq.(5) results, which, using the boundary conditions Eq.(4) gives Eq.(6) for a level $\tau=0$. This can again be re-expressed in the forms Eqs.(7), (8) if $\gamma(t, \varphi)$ does

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SOV/49 -58--10-7/15

On Interpreting Observations of Sky Brightness

not depend on height. As is shown in Ref.2, the scattering function of a real atmosphere changes considerably with height. Hence, the value of γ calculated from Eqs.(7) or (8) is called the relative scattering function averaged over the whole atmosphere. A more realistic average is that defined in Eq.(10); which transforms Eqs.(6) to the form (11), (12). Using the averaged scattering functions Eqs.(9) and (10), some information can be obtained on the change of $\gamma(t, \phi)$ with height for a given sky brightness at the Earth's surface. The atmosphere is assumed to consist of n layers in each of which γ is constant. Eqs.(9) and (10) are then written in the form Eqs. (13) and (14). If measurements are made of the sky brightness at sufficiently small time intervals for n points (θ_k, ϕ_k) and the resultant values substituted in Eqs.(13) and (14), n equations are obtained to determine the scattering functions for the n layers with ϕ = ϕ_0 . The system of equations has the form Eq.(17). Localization of the layers requires a knowledge of σ(z). The role of multiple scattering is considered in relation to the data given in Ref. 3. The results are related Card 3/7 to an idealized two-layer model. The calculated brightness

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On Interpreting Observations of Sky Brightness is expressed in the form:

brightness due to first order scattering and BII due to brightness due to first order scattering and BII due to higher order scatterings. Table 1 gives values for $100B_{11}/B$ higher order scatterings. Table 1 gives values for the when $\tau=0$, and Fig.1 shows the scattering indices for the two layers. Table 1 shows that the part played by multiple scattering increases with τ . The effect of multiple scattering is indicated even better in the case represented scattering is indicated even better in the case represented by Table 2. This gives the scattering function as defined by Table 2. This gives the scattering function as defined by Table 2. This gives the scattering function as defined to the scattering function as defined by Table 2. This gives brightness $B(0,\tau)$. Table 2 does together with the relative brightness $B(0,\tau)$. Table 2 does not show the change in δB due to change in ϕ or ϕ - this not show the change in δB due to change in ϕ or ϕ - this smaller values of δB than Table 2 and shows there is a value of ϕ_0 for which $\delta B_N(0,\zeta,\phi_0)=0$. Table 4 gives

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Card 5/7

SOV/49-58-10-7/15

On Interpreting Observations of Sky Brightness

the diminution m multiple scattering with height. The relative brightness $\overline{B}(\tau,\,r)$ and relative scattering function $\gamma(\phi)$ are those of the model atmosphere curve 2 in Fig.1. Table 5 gives the change in correction due to multiple scattering more accurately. The method of estimating the effect of multiple scattering worked out by Ye. V. Pyaskovs-kaya-Fesenkova can be put very simply for $\theta = \zeta$. Writing down Eq.(19) with the notations (20), (21) and (22) it is found that the substitution $B_{II} = a(\tau - \tau^*)$ can be made in Eq.(25) to give Eq.(26) (c.f. Ref.3). Table 6 gives values of B_{II} as a function of ϕ and ϕ for various values of of the brightness $B(0,\zeta,\phi)$ for the values of γ given in the first column, corresponding to the lower layer (γ = 1.3, in the upper layer). Values of γ calculated from Eq.(14) and γ (γ by Piaskovskaya-Fesenkova's method are also given together with γ , which can be considered as the optical thickness corrected for multiple scattering. The following conclusions are drawn: (1) Single scattering formulae can be used for determining the scattering function when γ 0.15 with an error γ (0.15 Eq.(7) does not

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On Interpreting Observations of Sky Brightness

have a physical interpretation - it cannot be used for defining the scattering function averaged over the whole atmosphere. (3) For $\tau^*>0.2$, the brightness curve measured at the Earth's surface differs considerably from the average relative scattering index owing to multiple scattering. In this case, the part played by multiple scattering is considerably larger for directions $\phi>90^\circ$ than for $\phi<90^\circ$. (4) The effect of multiple scattering diminishes with height. At heights of 7-10 km the single scattering theory can be used for $\tau^*=0.4$ with greater accuracy than for $\tau^*=0.2$ in the surface layers. (5) Condition (23) is approximately fulfilled in the angular interval $30^\circ \leqslant \phi \leqslant 130^\circ$. For

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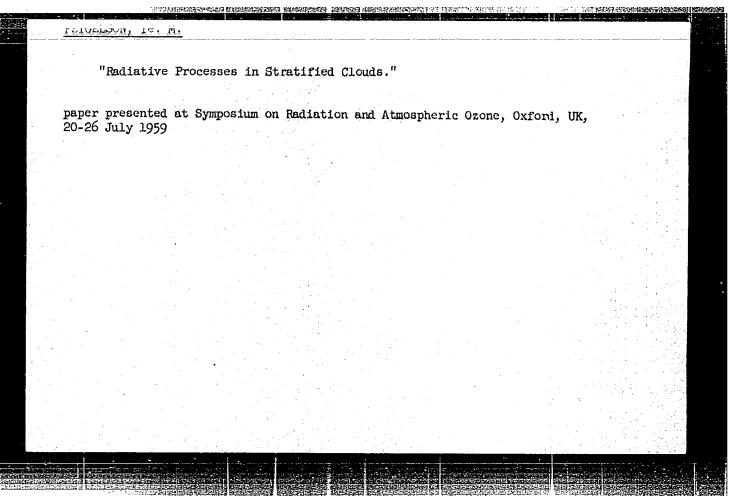
On Interpreting Observations of Sky Brightness

r*≤0.4 and Γ≤2.5, the error in Pyaskovskaya-Fesenkova's method does not exceed 15-20% for φ≤120°. There are 7 tables, 1 figure and 4 references; 3 of the references are Soviet and 1 is English.

ASSOCIATION: Akademiya nauk SSSR, institut fiziki atmosfery (Academy of Sciences, USSR, Institute of Atmospheric Physics)

SUBMITTED: October 21, 1957.

Card 7/7



. AUTHOR: Feygel'son, Ye. M.

TITLE: The Radiation Cooling of Stratus Cloud.

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya geofizicheskaya, 1959, Nr 6, pp 347-857 (USSR)

T: The top layer of the stratus cloud in relation to the atmosphere above is considered. The variations of the tem-ABSTRACT: perature in the cloud are obtained from Eq (1) while those above it are obtained from Eq (2), where c - specific air temperature at constant pressure, $\rho(z)$ - air density, $T^{(o)}(z,t)$ - cloud temperature, t - time, $\rho_v(z,t)$ -(o)(z, t) - density of cloud density of cloud water drops, - damping coefficient of the water vapour (humidity), in water, $\alpha_{w,\lambda}$ wavelength λ - damping coefficient of water vapour, $\lambda_0 = 4\mu$ - lower limit of the range of wavelengths, $\lambda_1 = 40$ -their upper limit, $I_{\lambda}^{(0)}(z, r, t)$ - intensity of radiation at wavelength λ in the direction rprimary angle, B₁(T) - Planck function, L - latent heat Card 1/5

The Radiation Cooling of Stratus Cloud

of condensation. Since the above equations contain the unknown magnitudes $T^{(0)}(z,t)$, $T^{(1)}(z,t)$, $T^{(0)}(z,r,t)$, $T^{(1)}(z,r,t)$, $T^{(1)}(z,r,t)$, formulae (3) and (4) should be included. The solution of Eqs (1) to (4) is found for the following conditions: $T^{(1)}(z,0), \quad j=0,1,$ $T^{(0)}(H,r,t)=T^{(1)}(0,r,t),$ $T^{(1)}(z,r,t)/z=\infty=0 \text{ at } 0>\pi/2$ (H - thickness of cloud, 0 - polar angle of direction r). Since the water vapour in the cloud is saturated, the function (5) can be defined, where $q_w^{(0)}(z,t)$, $E_0=6.1_{mb}$ - saturation elasticity of water vapour at $0^{\circ}C$, a=7.5, $b=237.0^{\circ}C$, $R_w=460 \text{ m}^2/\text{sec}^2$ deg - gas constant, t^* - Card 2/5

The Radiation Cooling of Stratus Cloud

temperature in degrees C (index 1 = atmosphere, index 0 = cloud). These conditions are applied in Eq (6) for the atmosphere above the cloud. The coefficient of damping for drops of 6.265 μ radius is taken from Ref 4, as illustrated in Fig 1, continuous line (the dotted line - data from Ref 5). This coefficient is calculated from Eq (7) where α_V - mean damping coefficient (Eq 8). The calculation shows that α_{V,λ}, given in Fig 1, can be substituted by α_V = 1000 - 1500 cm²/g. Then the value of A will be obtained with an accuracy of 3%. Thus Eqs (1) and (2) can be adjusted as Eq (9). Also, taking into account the thickness of the cloud, (Eq (10)), and the mass of a vertical column of water vapour in the atmosphere above the cloud, (Eq (11)), the final form of Eqs (1) and (2) can be written as Eqs (13) to (17). Fig 2 gives the values of B₁(T) and B(T). As an example, the following are given: T₀ = 273°, B₀ = 0.146 cal/cm²min, P_{W,0} = 4.9 x 10⁻⁶ g/cm³, P = 1.3 x 10⁻³ g/cm³, c_p = 0.24 cal/g deg, t₀ = 24 hours, α_V = 1100 cm²/g, α_W = 1 cm²/g,

The Radiation Cooling of Stratus Cloud

 $9_{v,o} = 0.5 \times 10^{-6} \text{ g/cm}^3$, then the values $a^{(0)} = 0.117$, $a^{(1)} = 13.1$, $b = 0.398 \times 10^{-2}$ are calculated from Eq (17)

for L = 590 cal/g. The formulae (13) and (14) can be obtained as the dimensionless equations (18) to (24), where $R(\tau, t)$ is the function of temperature (Fig 3). Table 1 illustrates the values of

 $T^{(0)}(\tau, t_1), \rho_w^{(0)}(\tau, t_1)$ and $\rho_v(\tau, t_1)$

at different points of the cloud. Table 2 gives the above values for the top boundary of the cloud for $\Delta t = 0.5 \, h$. Table 3 gives the density of the drops (second column) and its upward rate of fluctuation (third column) for three types of cloud (first column): rain-cloud, cumulus-stratus,

Card 4/5

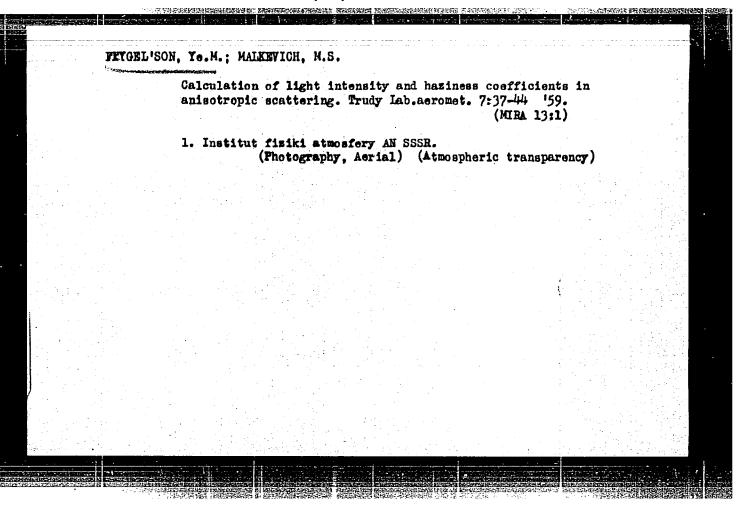
The Radiation Cooling of Stratus Cloud

and stratus (Ref 9). Fig 4 illustrates the increase of temperature due to the latent heat of condensation at four consecutive moments ($\Delta t = 0.5 \text{ h}$). There are 3 figures, 4 tables and 9 references, of which 8 are Soviet and 1 is English.

ASSOCIATION: Akademiya nauk SSSR, Institut fiziki atmosfery (Academy of Sciences of the USSR, Institute of Physics of the Atmosphere)

SUBMITTED: September 10, 1958.

Card 5/5



SOV/49-59-9-23/25

AUTHOR: Kastrov, V. G. and Feygel'son, Ye. M.

TITLE: Conference on the Actinometry and Atmospheric Optics

Izvestiya Akademii nauk SSSR, Seriya geofizicheskaya PERIODICAL:

1959, Nr 9, pp 1435-1436 (USSR)

ABSTRACT: The Conference was convened in Leningrad on January 28

to February 4, 1959, by the Commission of Physics of the Atmosphere, Academy of Sciences, USSR, the Leningrad State University and Central Geophysical Observatory. Altogether 102 papers were presented. The separate sessions were devoted to: radiation, sky luminosity

and polarisation, reflective properties of the foundations surfaces, transition of atmospheric radiation, methods of actionometric measurements and radiation in industry. L. G. Makhetkin spoke on new characteristics of the atmospheric turbulence; T. G.

Berlyand described the distribution of solar radiation on the Earth; N. T. Chernigovsky, N. T. Rusin, T. V. Kirillova, M. S. Marshunova, B. M. Gal'perin and M. K. Gavrilova dealt with investigations of radiation in the

Arctic and Antartic; G. N. Faraponova, Yu. I.

Rabinovich, V. I. Myukhyur and G. P. Gushchin discussed Card 1/3 the decreasing of sunlight at 6 to 7 km high;

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Conference on the Actinometry and Atmospheric Optics

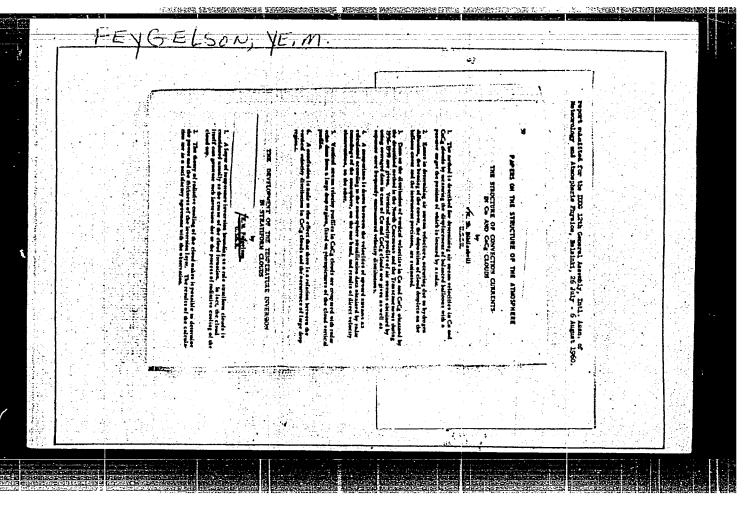
O. D. Barten'yeva spoke on the determination of the indicatrix of light diffusion in ground surface layer of the atmosphere (apart maximum at O and 180° an additional maximum 130 to 145°, corresponding to the rainbow, was defined); B. A. Chayanov described an automatic photometer with a range of 25 km; G. V. Rozenberg dealt with investigations of the angular diffusion of polarised light in the ground surface atmosphere; Ye. M. Feygel'son considered the cocling of cloud tops and its effect on precipitations. The other papers and their authors were as follows: K. Ya. Kondrat'yev - Carbon oxide in the atmosphere; I. N. Minin - Transfer of radiation affected by refraction; Yu. D. Yanishevskiy - Pyrheliometer as a radiation counter; V. S. Atroshenko and O. A. Avaste - Cn the Sobolev transfer equation in optics; K. S. Lyalikov, L. B. Krasil'shchikov, N. Ye. Tep-Markarvants, N. I. Goys, K. Ya. Kondrat'yev, Z. F. Mironova and L. P. Dayeva - Determination of Albedo and spectral luminosity; M. S. Malkevich - Reflecting

Card 2/3

Conference on the Actinometry and Atmospheric Optics

properties of the ground surface in relation to light diffusion in the atmosphere; V. G. Kastrov - Errors in determining the absorption of solar radiation in the atmosphere. The Conference approved the formation of a special commission for the revision of therminology. The addresses of two members of the commission are given.

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PHASE I BOOK EXPLOITATION

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Georgiyevskiy, Yu. S., A. Ya. Driving, N. V. Zolotavina, G. V. Rozenberg, Ne. M. Feygel'son and V. S. Khazanov

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Proxhektornyy luch v atmosfere; issledovaniya po atmosfernoy optike (Searchlight Ray in the Atmosphere; Investigations in Atmospheric Optics) Moscow, Izd-vo AN SSSR, 1960. 243 p. Errata slip inserted. 1,600 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut fiziki atmosfery.

Ed. (Title page): G. V. Rozenberg, Professor; Ed. of Publishing House: N. L. Relesnin; Tech. Ed.: I. F. Koval'skaya.

PURIOSE: This book is intended for geophysicists concerned with searchlight sounding of the atmosphere and questions in atmospheric optics.

COVERAGE: The book reports on recent investigations of the effect of atmospheric conditions on the visibility of distant objects illuminated by a searchlight, and the utilization of a searchlight beam for investigations in atmospheric coptics. The authors limit themselves to that side of the problem directly

Card 1/6 4

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Searchlight Ray in the Atmosphere (Cont.)	SOV/ 5019	1. 1
connected with atmospheric conditions, but give a view of present-day data on the optical propertie tention is concentrated on studies made by the aust the Laboratoriya atmosfernoy optiki Instituta mauk SSSR (Laboratory of Atmospheric Optics of the Atmosphere AS USSR). No personalities are metallicons and the Atmosphere as USSR).	es of the atmosphere. At- uthors and their colleagues fiziki atmosfery Akademii he Institute of Physics of antioned. There are 173	
references: 100 Soviet, 50 English, 25 German, an	nd 10 French.	
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5/049/60/000/02/013/022 E032/E414 AUTHOR: Feygel'son, Ye.M. TITLE: The Effect of Turbulence on the Radiation Cooling of Clouds V PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya geofizicheskaya, 1960, Nr 2, pp 299-308 (USSR) It is to be expected that weak turbulent mixing, which ABSTRACT: was neglected in the previous paper by the present author (Ref 1) would tend to reduce radiation cooling since the latter takes place in a very thin layer (Ref 1). The present paper is therefore concerned with the extension of the model discussed in Ref 1 to the case which includes turbulent heat transfer. The latter effect is estimated approximately. It is found that the turbulent mixing coefficient D (cm²/sec), which characterizes the turbulent heat transfer, lies between 2 x 10⁴ and 50 x 10⁴ cm²/sec. For such values of D, the radiation cooling near the cloud boundary is shown to be of the order of 0.1 to 1.7° per half-hour. Pure radiation cooling under these conditions is 6°/half-hour. Simple calculations show that turbulent mixing Card 1/2

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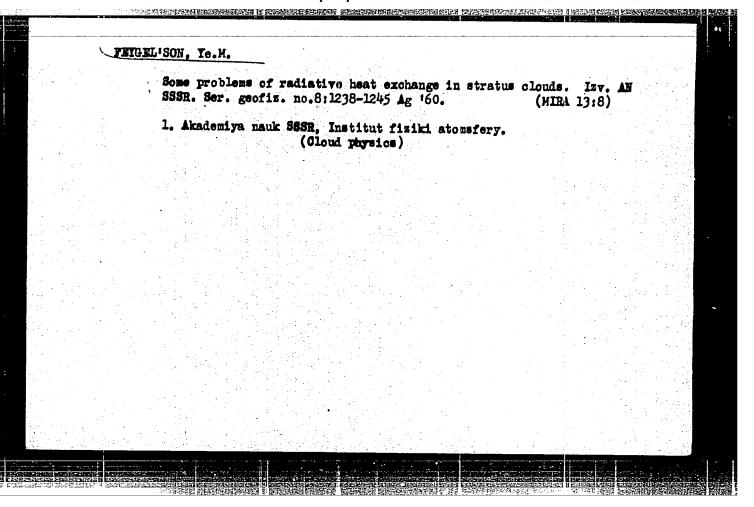
The Effect of Turbulence on the Radiation Cooling of Clouds

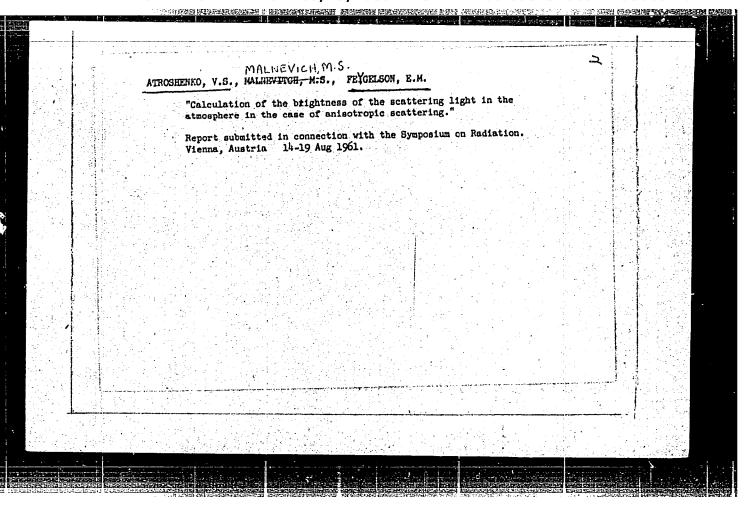
considerably weakens the radiation cooling process for the upper parts of the cloud and leads to an increase in the thickness of the cooling layer. The numerical calculations are summarized in Tables 1 to 3, in which the symbols are said to be defined in the previous paper (Ref 1). There are 1 figure, 4 tables and 6 references, 5 of which are Soviet and 1 English.

ASSOCIATION: Akademiya nauk SSSR Institut fiziki atmosfery (Academy of Sciences USSR, Institute of Physics of the Atmosphere)

SUBMITTED: February 24, 1959

Card 2/2





ATROSHEMEO, V.S.; GLAZOVA, K.S.; MALKEVICH, M.S.; FEXCEL'SON, Ye.M.;
Prinimali uchastiye: KIM, E., studentka; TOMASHOVA, L., studentka;
ROZENBERG, C.G., prof., doktor fiz.-matem.nauk, otv.red.;
FEMKINA, N.V., red.;zd-va; SUSHKOVA, L.A., tethn.red.

[Calculation of light intensity in the atmosphere during anisotropic scattering. Fart 2] Raschet larkosti sveta v
atmosfere pri anisotropnom rasselanii. Chasti 2. Moskva,
Izd-vo Akad.nauk SSSR, 1962. 222 p. (Akcidenti nauk SSSR.)
Institut fiziki atmosfery. Trudy, no.3). [MICROFILM] (MIRA 15:8)

1. Moskovskiy gosudarstvennyy universitet (for Kim, Tomashova).

(Light—Scattering) (Atmosphere)

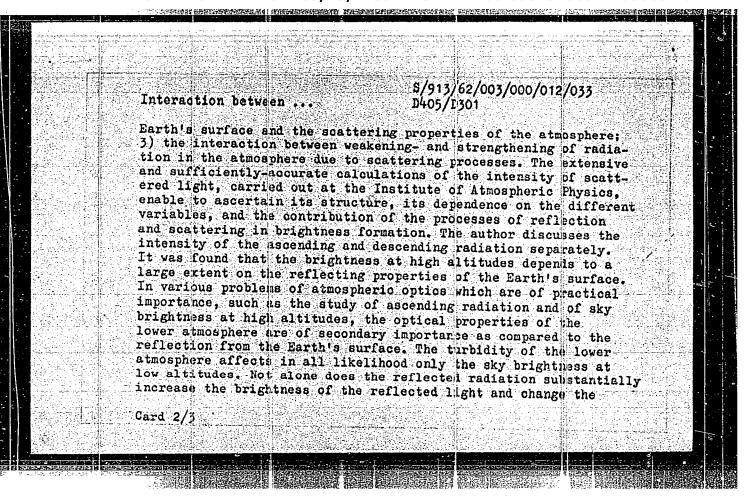
PEYGFL'SON, YZ, M.

Dissertation defended for the degree of <u>Doctor of Physicomathematical Sciences</u> at the Joint Scientific Council of the Geophysical Institute of the Academy of Sciences USSR--Earth Physics, Atmospheric Physics, and Applied Geophysics in 1962:

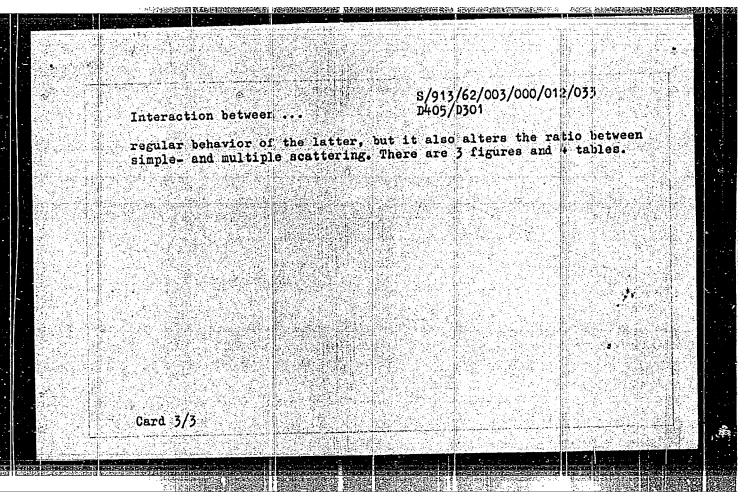
Radiation Processes in Stratified Clouds.

Vest. Akad. Nauk SSSR. No. 4, Moscow, 1963, pages 119-145

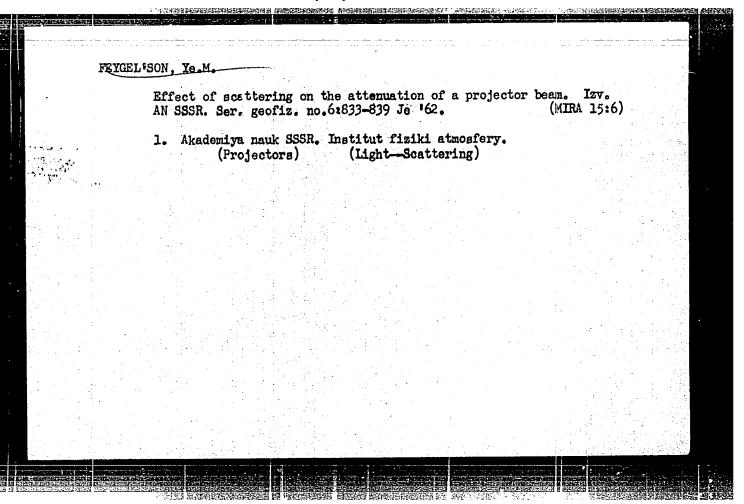
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AUTHOR:	Feygel'son, Ye. M.
TITLE:	Interaction between scattered- and reflected light of diurnal sky
SOURCE:	Akademiya nauk Kazkahskoy SSR. Astrofizicheskiy institut. Trudy. v. 3. 1962. Rasseyaniye i polyarizatsiya sveta v zemnoy atmosfere; materialy Soveshchaniya po rasseyaniyu i polarizatsii sveta v atmosfere. 74 - 82
pendent varia are the optic angles of the affect the in direct solar	The intensity of the scattered light in a plans- sphere can be regarded as a function of three inde- ables and of four parameters; the independent variables sal thickness of the atmosphere and the polar and azimuth a direction of light propagation. The main factors which attensity are: 1) the relation between the fluxes of and descending scattered radiation at the Earth's sur- are relation between the reflecting properties of the
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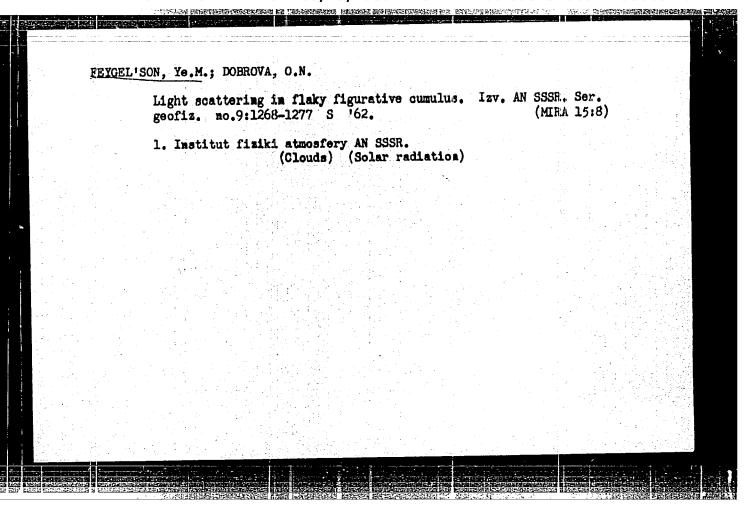


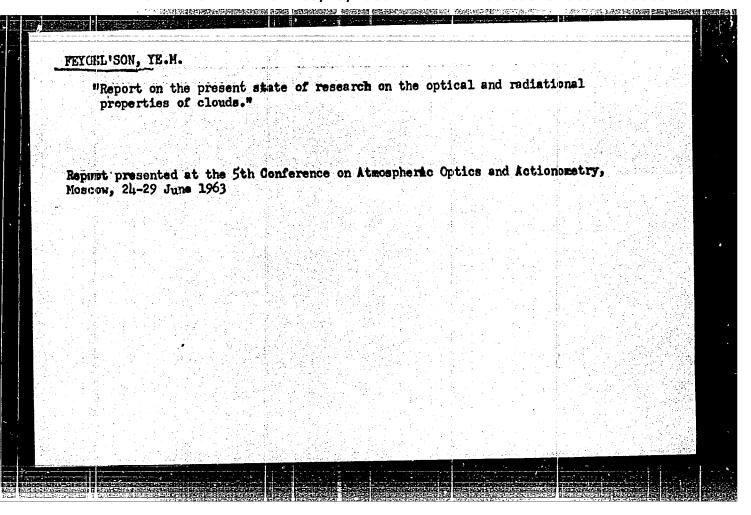
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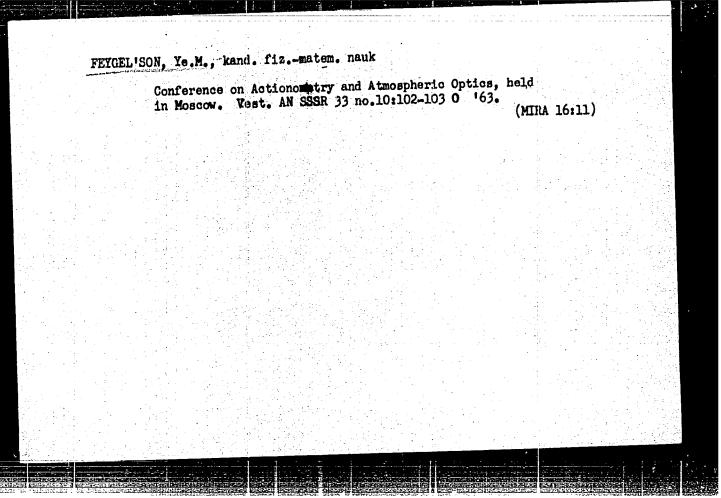


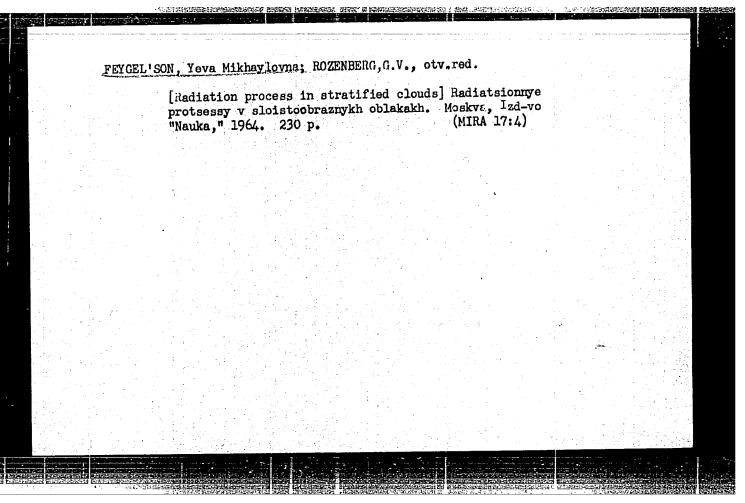
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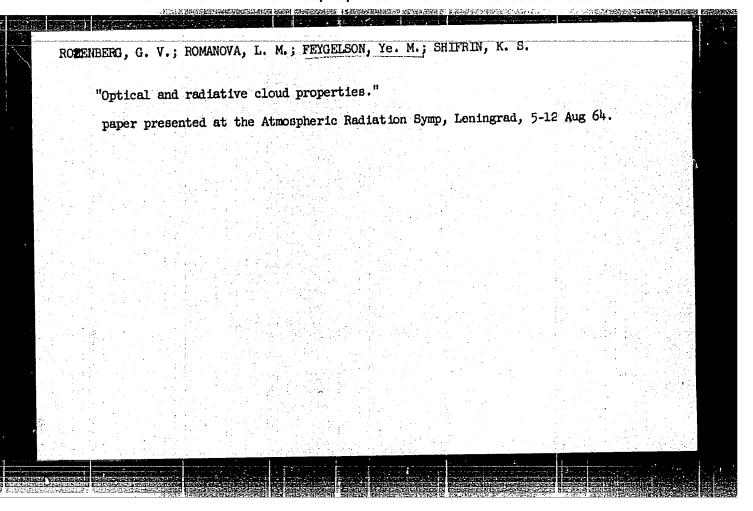




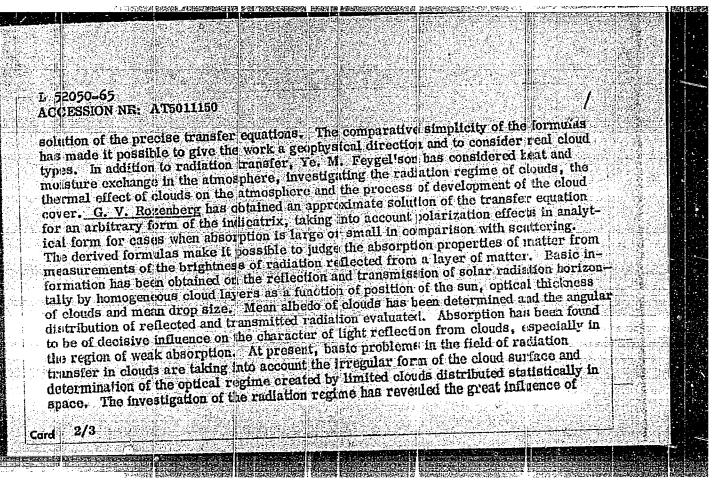


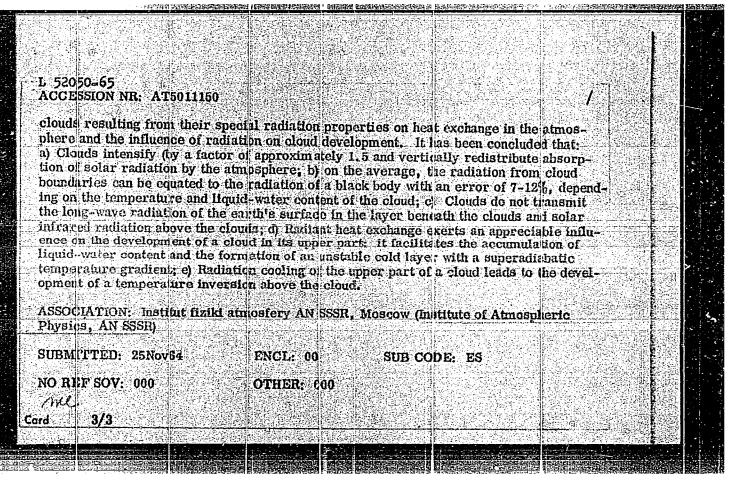






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AUTHOR: Feygel'son, Ye. M.		1871
TITLE: Radiation and optical p		
Moscow, 1963. Aktinometriya trudy soveshchaniya. Moscow,	ent. atmospheric optics, radiation absorp	
ABSTRACT: This is a summariya, Vol. 2, No. 3, 1964. The has done considerable work on scattering and absorbing medicat the study of the optical and in four directions by three spe for solution of the precise tran	ry of a report to be published in Kosmioher institut fiziki atmosfery (Institute of Atmitivestigating the propagation of radiant et a. In particular, these investigations have radiation properties of clouds. The work celalists: L. M. Romanova has developed to after equations, adapted for high-speed confer equations, using Romanova's data for obtained analytical expressions for the agents.	nergy in strongly e been directed has been pursued numerical methods omputers, and control and





ACCESSION NR: AP4043909

5/0049/64/000/008/1247/1252

AUTHOR: Petrova, L. V.; Feygel'son, Ye. M.

TITIE: Role of radiation in cloud development

SOURCE: AN SSSR. Izvestiya. Seriya geofizicheskaya, no. 8, 1964, 1247-1252

TOPICTAGS: cloud physics, atmospheric physics, atmospheric radiation, atmospheric longwave radiation, cloud formation, temperature inversion

ABSTRACT: In investigations of the origin and development of nonconvective clouds, it is customary to consider heat exchange and moisture exchange in the atmosphere brought about by vertical movements, turbulent mixing, and phase transformations of water. This paper differs in that, in addition to these factors, the authors also take into account the heat flux associated with the transfer of longwave radiation and the role of the latter in cloud formation. The method used in solving this problem was proposed by L. T. Matveyev and was described in an earlier paper by Ye.M. Feygel'son (Izv. AN SSSR, Ser. geofiz., no. 3, 1962). This article gives some numerical results showing the influence of a radiation heat flux on the variation in the liquid water content of a cloud. Computations, made with

Card 1/3

ACCESSION NR: AP4043909 "Ural-1" electronic computer, revealed that a cloud develops upward under the influence of radiation cooling. It was also found that the contribution to water content from radiation decreases with an increase in the velocity of ascending movement. In this case the role of vertical movements as the principal factor in cloud formation is manifested. With an intensification of vertical movements the relative importance of the other factors is lessened. In the center of a cloud the effect of radiation is less than that of turbulence, but it is not negligible in comparison with the latter. In the upper part of a cloud, the role of radiation transfer is the dominant one. The generally-accepted mechanism of formation of stratus clouds, taking into account vertical movements and turbulent transport of heat and moisture, is thus shown to be incomplete. This result confirms the conclusion previously drawn by Feygel'son (Izv. AN SSSR, Ser. geofiz, no. 6, 1959 and no. 7, 1960) that radiation has a decisive effect on the formation of the upper layers of a cloud. The conditions imposed in these earlier studies (liquid water content does not decrease in the direction of the upper boundary) made it possible to investigate directly the thermal effect of radiation, i.e., the development of a temperature inversion. In this new study the formulation of the problem is such that the liquid water content of a developing

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8/0293/64/002/003/0455/0461 ACCESSION NR: AP4041568 Feygel'son, Ye. M. AUTHOR: TITLE: Optical properties of clouds SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 3, 1964, 455-461 TOPIC TAGS: cloud, atmospheric optics, meteorology, meteorological satellite, cloud optics, cloud albedo This article is a brief review of studies of cloud optics made at the Institute of Atmospheric Physics by Ye. M. Feygel'son, L. M. Romanova and G. V. Rozenburg; original sources are cited in the bibliography. Principal attention in the review is given to theoretical work on the transport of radiation in clouds, determining the laws of reflection and transmission of radiation by clouds, without taking into account the influence of the atmosphere outside clouds. In these studies the following conclusions were drawn. 1. In the visible part of the spectrum the scattered light of haze considerably distorts the light passing from the cloud to the upper boundary of the atmosphere. 2. The light of haze over clouds is not dependent on wavelength; this is true of cloud albedo as well. It therefore is impossible to Card

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count on distinguishing clouds situated at identical levels on the basis of a change of the spec-	8
tral dependence of their brightness. 3. Low-lying clouds can be brighter than high-lying	
clouds due to the greater thickness and scattering capacity of the first. Therefore it also is	
doubtful if cloud levels can be distinguished on the basis of differences in their brightness. 4. The angular distribution of the light reflected from a cloud is relatively uniform except in	
the region of azimuthal angles $135^{\circ} \le \forall \le 180^{\circ}$. In the latter case, in the event of low solar	
altitudes there is a rapid increase of brightness in the direction of the horizon. It scarcely	
will be possible to make use of this peculiarity, since it also is characteristic of snow and	
atmospheric haze. 5. A difference of albedo at the center ($\lambda = 0.764$) and on the wing of	K 3-7-1
the oxygen absorption band can introduce an error of the order of 10-20% into determination	7.2
of the optical thickness of the atmosphere over the cloud. 6. An opaque cloud can be con-	
sidered a black body with an error of 5-10% in the spectral range $(4 \le \lambda \le 7 \text{L})$ and (12 40). In the atmospheric window of transparency $(8 \text{L} \le \lambda \le 12 \text{L})$ this error is	
15-25%. These conclusions, important in the field of satellite meteorology, are followed by $\frac{1}{2}$	
a listing of what the author feels are highly important unsolved problems in atmospheric	4.25.23 4.25.23
option. Orig. art. has: 3 formulas, 9 figures and 1 table.	
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